

After a very lengthy investigation of the biochemical changes which occur in the natural ripening of the wheat berry, its preparation or "conditioning" in the mill, and the influence of variations in the treatment of the resulting flour in the bakehouse, I am fully convinced that it is no longer the bakehouse that has to give the final verdict on the qualities of flour, as laboratory methods can now provide all the data necessary for inferring the antecedent conditions, defining the present qualities, and anticipating the future evolution of wheat or its product, flour.

A. J. BANKS.

Waterloo, Liverpool, March 11.

#### Ionisation and Anomalous Dispersion.

IN NATURE of February 21, Prof. Wood, referring to my letter of January 17, says that the effects observed were probably due to disturbance of the density gradient of the sodium vapour caused by "local heating by the wire." I am afraid that in my letter I cannot have described the experimental arrangement sufficiently clearly; at any rate, Prof. Wood seems to be under a mistaken impression.

The wire was merely an electrode insulated from the tube containing the sodium vapour, but connected to one pole of a battery, the other being connected to the tube. A current passed through the sodium vapour, or the nitrogen left in the tube after exhaustion and heating, presumably an ionisation current; and this was of the order of one microampere, and could hardly produce much local heating.

Be this as it may, since I left Aberystwyth my pupil, Mr. Needham, noticed an effect which, if confirmed, appears to me to be decisive in favour of a connection between ionisation and dispersion. While the tube was heated, by a flame as usual, with 10 volts there was a current of 4 divisions and an anomalous dispersion of 9 divisions. On raising the voltage to 58 volts, the current rose to 10 divisions, but the *anomalous dispersion immediately fell to zero*, and thereafter slowly increased to a value somewhat greater than before.

That an increase of current, and presumably of local heating, if there be any, should diminish the dispersion temporarily can hardly be understood, unless the systems producing the dispersion are themselves electrically charged and swept away to the electrode. I hope shortly to investigate the whole question fully, so as to decide definitely what connection, if any, exists between ionisation and dispersion.

G. A. SCHOTT.

Physical Institute, Bonn, February 26.

#### The Rusting of Iron.

IN NATURE of February 21 (p. 390) Prof. W. R. Dunstan states that rusting of iron takes place in the presence of water and oxygen when every trace of carbonic acid has been removed. To a certain extent this is the result obtained by our chemist, but his experiments proved conclusively that rusting must be due to an admixture of carbonic acid, for with improved precautions against its presence rusting was enormously reduced, and, this is important, confined to one or two spots. In some cases this local rusting took place where the steel samples rested on the glass vessels, and it was but natural to suppose that this local corrosion was brought about by silicic acid of the glass. The obvious precaution was to arrange an iron bowl in the centre of the glass vessel into which water could be distilled, but although this apparatus was constructed, it was not used, because if corrosion can be caused by the silica of the glass, then it may also be caused by specks of exposed slag in the iron or by the oxidised specks of manganese sulphite which can be seen with the microscope, or by other impurities. Corrosion may even be brought about by carbonic acid occluded in the iron. In order to settle the question, the experiment should be repeated with a piece of iron of absolute purity.

C. E. STROMEYER.

Manchester, March 5.

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#### A Problem in Chance.

THE law of probability is often illustrated by the simple method of supposing a bag filled with an equal number of white and black balls, which are presumably uniformly distributed within the bag. It is stated that the chances are equal that any extracted ball will be black or white.

I am desirous of ascertaining how this equality of extraction of either colour would be disturbed if it be assumed that the balls are not merely inert, but that there is an inherent tendency for like-coloured balls to cluster together. Two subsidiary and mutually alternative conditions may be further assumed: either the tendency of the black balls to cluster together is greater than that existing between the white balls, or it is equal. It is the former of these two subsidiary conditions that interests me.

Perhaps I may state the problem in more definite form. Assume 2000 balls, of which half shall be black and half white, placed in a bag. The intensity with which the latter tend to cluster= $d$ , and that of the former is greater, but to a less degree than half as much again. The balls are extracted in groups of eight. In four separate extractions, what will be the probable proportion of black and white balls at each extraction? And how many extractions will have to be made before it is probable that an equal number of black and white balls will have been withdrawn?

GEO. P. MUDGE.

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#### THE UNIVERSITY OF THE CAPE OF GOOD HOPE.

ON the invitation of Sir Lauder Brunton, a meeting took place at his residence on January 21 of gentlemen interested in university education. Among those present were Sir Arthur Rücker (of the London University), Dr. Donald MacAlister (then of Cambridge University, and president of the General Medical Council), Prof. Perry (Royal College of Science), Sir W. Arbuckle (Agent-General of Natal), Sir David Gill, Sir John Buchanan, and Mr. Howard d'Egville, honorary secretary Imperial Federation (Defence) Committee. Prof. Osler (of Oxford University), Sir Norman Lockyer, K.C.B., Sir Thomas Fuller (Agent-General for Cape Colony), and Prof. Stirling, dean of the medical faculty of the Victoria University, were unfortunately prevented from attending. Copies of the proposals provisionally agreed to by the committee of University of the Cape of Good Hope, relative to the re-organisation of that University, had been circulated before the meeting, and formed the basis of the evening's discussion. The result was a consensus of opinion on several leading issues, which may be summarised as under:—

(1) That in the existing condition of South Africa the interests of the higher education of the country would best be served by the continuance of only one examining and degree-conferring university.

(2) That the conferring on single colleges in the country the power of granting degrees to their own students would be detrimental to higher education, and specially injurious to the status of all such South African graduates. Such degrees would be depreciated, not only in the estimation of the people of the country itself, but also outside the colony, and would not have the same value or consideration given them which degrees granted by one general University would receive. The tendency of multiplying degree-granting institutions in the circumstances such as those existing in South Africa would be in the direction of unhealthy competition, which would inevitably lower, and not raise, the worth of degrees so obtained.

(3) That sound education would be promoted by associating in examinations the teacher with independent examiners, but the University should control all

examinations, and alone determine the granting of degrees. The appointment of examiners outside the influence of local institutions is desirable, so as to secure confidence in the impartiality of the examination; examiners of experience in teaching the subjects in which they examine should be employed. Efficiency, as well as confidence, would further be secured by obtaining as presiding members of each board of studies examiners experienced in teaching in institutions in the older centres of education.

(4) That all colleges should be affiliated with the University, and should be directly represented on the University council, if necessary, larger representation being given to the larger institutions.

(5) That in any new Act of Incorporation or new charter provision should be made so as to leave the University free to expand, and to include new teaching bodies, as well as to develop in any direction in which the progress and prosperity of the country might in the future indicate.

#### AN ANTHROPOLOGIST AMONG THE TODAS.

DR. RIVERS has re-discovered the Todas. This curious little nation, long known to us as an isolated social abnormality, in which the dairy industry takes the place of religion and matrimonial safety is found in a plurality of—husbands, now appears to be both much more and much less than this. As a descriptive monograph in ethnology the book is a remarkable achievement, but it is, perhaps, most significant on account of its method. The social sciences are at a disadvantage in that they are not exact, as physical and mathematical sciences are

enough in its application to deserve the epithet original. To the superficial reader little trace of this laborious preliminary process may be revealed, but the work will justify itself by remaining unsuper-seded. It struck me as interesting that the account is compiled in such a way as to show itself in the making, that it is an organism, revealing its own evolution.

The Todas are sufficiently isolated as to render the problem of their origin more or less insoluble. Dr. Rivers makes a very good case, of the cumulative sort, for their *provenance* from the Malabar races. There are some interesting clues leading us back to the Christianising of South India more than a thousand years ago.

In their social organisation, the new facts collected by Dr. Rivers make our knowledge of the Todas practically free from lacunæ. To the comparative student this very full and detailed account will serve, among other things, to connect the sociology of India with that of the rest of mankind. The polyandrous character of marriage, and the customs of *terersthi* and the like, deserve studying in these pages by anyone who takes an interest in the marriage problems of Western civilisation. The Toda view of morality in this sphere merits consideration, especially in connection with the altruistic emotions. Something similar has been recently observed by Messrs. Spencer and Gillen among the natives of Central Australia. Not least remarkable is the way in which their form of marriage seems actually to make for efficiency and—righteousness.

The chief regulations of the marriage system are in brief:—Prohibition of intermarriage between the two

"castes" *Tartharol* and *Teivaliol*; exogamy among the clans which compose these "castes"; certain kinship prohibitions; polyandry, the typical form of marital association, the extra husbands being generally brothers of the husband proper; polygyny, now on the increase, either in the ordinary form, or two men having two wives in common; the transference of wives from one group of husbands to another, *terersthi*; a sort of concubinage, as between members of the two great "castes," *mokhthoditi*.

We are supplied with a wealth of detail, practically new, in all the spheres of social life and religious practice. The economic sources of religion are more clearly laid bare in the full description of the dairy-religion of the Todas than would have ever appeared possible to the *a priori* speculator in anthropological theory. To quote Dr. Rivers:—"The sacred animals are attended by men especially set apart who form the Toda priesthood, and the milk of the sacred animals is churned in dairies which may be regarded as the Toda temples, and are so regarded by the people themselves. The ordinary operations of the dairy have become a religious ritual, and ceremonies of a religious character accompany nearly every important incident in the lives of the buffaloes." It would be a pity to attempt to skim the cream from the rich supply presented here; the reader will find it deeply interesting, and the student of religious origins will be well advised to ponder the whole subject. The best photographs in a well-illustrated book represent the operations of these milkmen, priests and

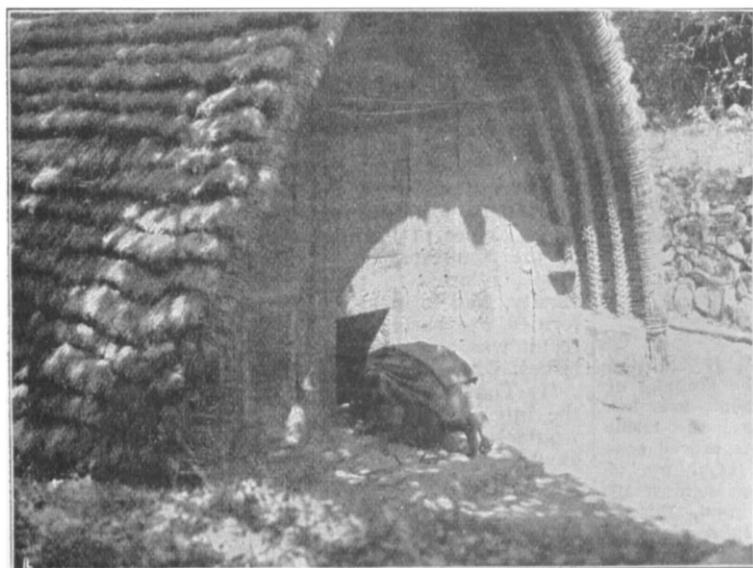


FIG. 1.—The "Palikartmikh" saluting the threshold of the dairy at Kiudr "Pavnersatiti." From "The Todas."

exact; but the present work is a proof that anthropology is attaining such exactness as the nature of the subject allows. This means a good deal, as anyone may see who compares the present monograph with the earlier accounts of the Todas. The testing of the evidence and the verification of fact have been carried out in the most pertinacious and patient manner, and the general method followed is new

<sup>1</sup> "The Todas." By W. H. R. Rivers, Fellow of St. John's College, Cambridge. Pp. xviii+755; with illustrations and tables. (London: Macmillan and Co., Ltd., 1906.) Price 21s. net.